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0.03 mm. in diameter, and another of 0.008 mm. The rotation was found to be unchanged, and the conclusion reached is that particles of sodium chlorate down to 0.004 mm. in diameter possess completely the crystalline structure which is necessary for circular polarization. In solution, however, sodium chlorate is perfectly inactive.

THE late determinations of the atomic weight of tungsten by E. F. Smith have given a number close to 184.9. More recently (J. Prakt. Chem. 53: 288) Schneider has repeated his earlier work which gave the number 184.12 and now finds the atomic weight to be 184.01. Schneider proved his tungsten to be free from molybdenum, but he used the same material as in his former determinations. He attributes the larger figure of Smith and others to the use of too small quantities, thereby involving relatively large errors.

LOBRY DE BRUYN has succeeded in completely dehydrating hydrazin-hydrate by means of barium oxid, a method unsuccessfully used by Curtius, and in the Rev. Trav. Chim. Pays-Bas 15: 174 describes the properties of the free hydrazin, N_2H_4 . Hydrazin is a solid, melting at $1.4^\circ C$ and boiling at $113.5^\circ C$ at 761.5 mm. It is soluble in alcohols, but only slightly so in other organic solvents. It dissolves many inorganic salts as sodium and potassium chlorids and nitrates. It is a stronger base than ammonia, liberating the latter from its salts. It reacts energetically with chlorine, bromine, iodine, sulfur and phosphorus, and oxidizes slowly in the air. It is noteworthy that the boiling point of free hydrazin, 113° , is very close to that of hydrazin-hydrate, 119° .

J. L. H.

SCIENTIFIC NOTES AND NEWS.

INVITATIONS have been sent for the opening of the new halls of ethnology and vertebrate paleontology of the American Museum of Natural History, New York. The reception will

be held from two to three o'clock on November 30th.

WE learn from *Nature* that the Royal Society's medals have this year been adjudicated by the President and Council as follows: The Copley medal to Prof. Carl Gegenbaur, For. Mem. R.S., for his researches in comparative anatomy, and especially in the history of the vertebrate skeleton; the Rumford medal to Prof. Philipp Lenard, and also to Prof. Wilhelm Conrad Röntgen, for their investigation of the phenomena produced outside a highly exhausted vacuum tube through which electrical discharge is taking place; a Royal medal to Sir Archibald Geikie, F.R.S., on account of the great value and importance of his many original contributions to geology; a Royal medal to Prof. Charles Vernon Boys, F.R.S., for his invention of quartz fibres and investigation of their properties, his improvement of the radiomicrometer and investigations with it, for developments in the art of instantaneous photography, and for his determination of the value of the constant of attraction; The Davy medal to Prof. Henri Moissan (of Paris), for the isolation of fluorine and the use of the electric furnace in the preparation of refractory metals; the Darwin medal to Prof. Giovanbattista Grassi (of Rome), for his most important discoveries, especially on matters directly related to Darwin's speculations. Her Majesty has signified her approval of the award of the Royal medals.

THE Secretary of the Permanent Committee of the International Zoological Congress announces the subjects for the two prizes, to be awarded at the next Congress. These are: 'A study of the ruminants of Central Asia, from the points of view of zoology and geography' and 'An anatomical and zoological monograph on some groups of marine invertebrates.' The papers, which may be in manuscript or printed since September, 1895, must be presented before May 1, 1898. They must be written in French, which seems to be contrary to the spirit of an international congress. It is in any case doubtful whether many men of science will care to compete for such prizes. We are somewhat vaguely informed that 'Les prix consisteront, au choix des lauréats, soit en

une somme d'argent, soit en une médaille de valeur égale.' The committee of award consists of MM. A. Milne-Edwards (Paris), President; R. Blanchard (Paris), Secretary; Sir Wm. Flower (London), F. A. Jentink (Leyden), R. B. Sharpe (London), Th. Studer (Berne) and N. Zograf (Moscow).

THE German Fisheries' Association has offered, according to *Nature*, a prize of 600 M. for the best essay on the history of development and the vital conditions of *Leptomitus lacteus*, with especial reference to its appearance and disappearance in impure water. The essays are to be sent in to Prof. Weigelt, 90-91 Zimmerstrasse, Berlin, S. W., by May 1, 1897.

At a meeting of the Royal College of Physicians, on November 6th, it was decided that the sum of £1,000, given by Captain E. Wilmot Williams, in memory of Dr. Bisset Hawkins, should be devoted to the establishment of a gold medal, to be awarded by the College every three years to some duly qualified medical practitioner who is a British subject, and who has, during the preceding ten years, done such work in advancing sanitary science, or in promoting public health, as in the opinion of the College deserves special recognition.

ACCORDING to *Garden and Forest* an agricultural experiment station has been established at Usambara, in German East Africa, for the purpose of investigating the agricultural character of that region and discovering its adaptability to various crops. Both native and introduced tropical plants are now under test at different altitudes to decide which ones are best suited to cultivation, and when these points have been determined both the plants and seeds will be supplied in commercial quantities to settlers.

It is reported in the daily papers that Dr. Lauterbach, Dr. Keruting and Herr Tappenbeck, who conducted an exploring expedition into the interior of New Guinea, returned to the coast at the end of October. The expedition discovered, at the foot of the great Bismarck Mountain, a navigable stream of considerable size, which flows through a fruitful, thickly populated plain well adapted for cultivation. This plain was explored for a distance of two hundred miles.

NEWS has also been received from two scientific expeditions now in Central Asia, under the auspices of the Russian Imperial Geographical Society. M. Clementz has been exploring Mongolia and the Hangai range of mountains. Dr. Swen Heding has been exploring the neighborhood of Khotan, where he has discovered the ruins of two ancient towns.

THE courses of lectures annually given by Columbia University, in cooperation with the American Museum of Natural History, have been arranged for the present season. There will be four courses as follows: 'Mountain Ranges of Western North America,' by Prof. J. F. Kemp, Dr. C. Willard Hays, Mr. Bailey Willis and Mr. H. M. Wilson. 'Anthropology and Ethnology,' by Dr. Daniel G. Brinton, Dr. Otis T. Mason, Dr. Franz Boas, Dr. Livingston Farland and Dr. William Z. Ripley. 'Alcohol and Alcoholic Beverages,' by Mr. C. E. Pellew. 'Botanical Studies,' by Prof. Lucien M. Underwood and Prof. Smith Ely Jelliffe. The lectures are given at the Museum of Natural History on Saturday evenings, beginning on December 6th.

THE Berlin Academy of Sciences has awarded its gold medal to Dr. Auwers.

THE German Electro-Chemical Society has awarded its annual prizes in recognition of contributions to the advancement of electro-chemistry to Prof. Hans Jahn, of Berlin, and Prof. Max LeBlanc, of Frankfort-on-Main.

DR. EDWARD S. HOLDEN, Director of the Lick Observatory, has received the decoration of Knight of the Royal Order of the Dannebrog of Denmark. This ancient order was founded in A. D. 1219, as a mark of military distinction, but is also conferred, as in the present instance, for services to science.

SIR JOSEPH LISTER and Prof. Michael Foster have been elected honorary members of the Asiatic Society of Bengal, in the place of Huxley and Pasteur.

It is stated in *Natural Science* that Mr. William Whitaker retired from the Geological Survey of Great Britain on October 22d. Mr. Whitaker, who is senior officer, was appointed on April 1, 1857, and has therefore held service for nearly forty years.

PROF. MAX VON PETTENKOFER has consented to fill the chair at the Academy of Science of Bavaria and to act as Keeper of the State Scientific Collection for a further term of three years.

Nature, quoting the *Kew Bulletin*, announces that the government of Zanzibar have decided to appoint a Director, and have selected Mr. Robert N. Lyne for the post. The object of the government in creating the post is to improve, where possible, the methods under which the agriculture of the country is now carried on, and to endeavor by experiment to discover some new product that may to a certain extent take the place of cloves. The government desire that the work so admirably begun by Sir John Kirk when he was Consul-General there, and since interrupted, may be continued.

SIR BENJAMIN WARD RICHARDSON, M.D., F.R.S., died on November 21st, aged sixty-eight years. He had made important investigations on the effects of anæsthetics, having discovered the use of ether spray for the abolition of pain in local surgical operations. He was the author of many articles and books treating especially of the subjects of public health and social reform.

THE death is announced of Admiral Sir George Henry Richards. He had conducted important nautical surveys and was in command of one of the vessels of the Franklin research expedition. He was a member of a number of learned societies, including the Paris Academy of Science.

WE regret to announce the deaths of Dr. Möller, professor of astronomy at Lund, on October 26th, at the age of 66 years; of Dr. Ernst Wenzel, associate professor of anatomy at Leipzig, on October 25th, at the age of 56 years; and of Dr. Eugen Bauman, professor of physiological chemistry, in the University at Freiburg in Breisgau, on November 3d, at the age of 50 years.

AT midnight on November 15th the electric power generated at Niagara Falls was transmitted to Buffalo where it will be used to operate the trolley cars of the street railway.

PROF. E. MACH has prepared an important work entitled *Die Principien der Wärmelehre*, treated from a historical and critical point of

view. It is published by J. E. Barth, of Leipzig, and includes 105 figures and six portraits. The same publishers announce the second issue of the *Jahrbuch der organische Chemie* for the year 1894, edited by Dr. Gaetano Minunni.

A MONTHLY *Hypnotic Magazine* has begun publication in Chicago, under the editorship of Mr. Sidney Flower. The journal will, we fear, find it somewhat difficult to maintain a satisfactory scientific standard.

The Illine, the weekly paper published at the University of Illinois, contains in the issue of November 6th an account of the fresh water biological station of the University, by Mr. C. A. Kofoid. The biological station at Havana is said to be unique in having for its basis of work the fauna and flora of a river, while there are numerous lakes and marshes in the neighborhood. The station was opened in the spring of 1894, and this year a floating laboratory was launched. This is 60x20 feet and contains three rooms, a small office and library, a general laboratory provided with aquaria, etc., and a cabin for the attendant. The boat is said to be free from tremor. In addition to the director, Professor Forbes, and other teachers, there were seventeen students in attendance during the past summer.

IT was provided by an Act of Congress passed early last year that the Superintendent of Documents should, at the close of each regular session of Congress, prepare and publish a comprehensive index of public documents. Mr. F. A. Crandall has, in spite of the short time and other difficulties, prepared the catalogue of the public documents of the fifty-third Congress and of all departments of the government for the period from March 4, 1893, to June 30, 1895, it being thus continuous with *The Ames Comprehensive Index*. The catalogue, which contains 638 large pages, will be of value to men of science, as perhaps one-half of the entries are on scientific subjects. Indeed, it is of much interest to note how largely the publications of the government are taken up with scientific subjects and the great importance of a majority of these. An alphabetical catalogue such as this will add much to the usefulness of the publications and to convenience in finding them.

WE learn from *Nature* that arrangements are being made to commemorate the sixtieth year of the reign of Queen Victoria by an exhibition at the Crystal Palace, to be opened on May 24, 1897. It is proposed to illustrate by models and practical examples the famous inventions in arts and industries during the past sixty years, and also the progress of other sides of national development. As a sort of prologue to this exhibition, a series of popular lectures, dealing with the advancements in science made during Her Majesty's reign, will be delivered during March and April next.

UNIVERSITY AND EDUCATIONAL NEWS.

THE Pope has appointed the Rev. Dr. Thomas J. Conaty, rector of the Church of the Sacred Heart, Worcester, Mass., to succeed Bishop John J. Keane as rector of the Catholic University at Washington. Dr. Conaty is a native of Ireland and is supposed to be more conservative than his predecessor.

PROF. WILLIAM M. SLOANE, of Princeton University, has been elected to the Seth Low professorship of American history in Columbia University.

HAVERFORD COLLEGE will soon come into possession of property valued at nearly \$500,000, bequeathed by Jacob P. Jones in 1885, subject to a life estate for his wife, who died a few days ago.

COLONEL C. S. VENABLE, for thirty-one years professor of mathematics in the University of Virginia, has retired.

ACCORDING to the *Academische Rundschau*, the additional yearly appropriations granted to the French universities under the new laws, to take effect January 1, 1898, will be approximately as follows: Lyons, 130,000 fr.; Bordeaux, 100,000 fr.; Toulouse, 80,000 fr. The remaining universities will receive sums varying from 20,000 to 50,000 frs. The amount of the appropriation to the University of Paris has not yet been decided, but it is expected that the five Paris Faculties, with their large number of students, will receive four or five times the amount appropriated to the Faculty at Lyons.

THE following foreign appointments are announced: Professor Lenard, director of the physical laboratory, Polytechnic Institute, at

Aachen, has been called to the University of Heidelberg; Dr. Czapek, Privatdocent at the University at Vienna, has been made associate professor of botany in the Polytechnic Institute in Prague; Dr. Seeliger, Privatdocent in zoology at Berlin, and Dr. Karl Mez, Privatdocent in botany at Breslau, have been promoted to professorships.

DISCUSSION AND CORRESPONDENCE.

AN OPTICAL ILLUSION.

TO THE EDITOR OF SCIENCE: I reproduce, in one of the accompanying diagrams (A), the arrangement used in a research published in the *Psychological Review* (II., May, 1895, p. 244), and reprinted in the *Princeton Contributions to Psychology* (No. 2, Sept., 1895), the result of which was to show that the judgment, *i. e.*, of the midpoint between two such squares as those of Fig. A, is subject to illusion. The actual midpoint, marked by the short line on the line of connection between the squares, is regularly judged to be too far toward the larger square, the real midpoint being judged farther toward the smaller. I should like to gather further results by the use of the Figures A and B, and your readers may be willing to assist as follows:

Ask people of both sexes, but recording the difference of sex, the following questions strictly in the order named, first of Fig. A. They should be entirely ignorant of the experiment and its results.

Question 1. Holding the figure before the eyes with *the bottom of the page down*, is the line connecting the squares bisected by the short line or not, and if not, is the real midpoint further to the right (R) or to the left (L)?

Question 2. Holding the page with *the bottom of it turned to the right hand*, ask whether the midpoint is marked by the line or whether it is farther up (U) or farther down (D).

Question 3. Holding the figure with *the bottom of the page upwards*, ask as in question 1.

Question 4. Holding the figure with *the bottom of the page toward the left hand*, ask as in question 2.

Then taking figure B., ask *the same questions in the same order*, being careful to have the person still altogether uninstructed as to the results of the first series and also to connect the